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BOVINE MASTITIS*

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I feel that I must begin by saying how greatly I appreciate the honour of being invited to address the North of England Division, a division which has in the past contributed notable papers to our literature, and in which, also, I am glad to remember some old and valued friends. The subject you have chosen for me, bovine mastitis, is one of the most important which any veterinary society could adopt for discussion. So that expectation may not be pitched too high, let me say now that I have no record of original work to offer you, nor do I hold any very unorthodox views on the subject. I do not think it is always necessary to be original. If to-day's paper and discussion help us to see a little more clearly what is already known I shall be satisfied that a useful purpose has been served.

As everyone knows, the Survey Committee of the "National" has done most valuable work on mastitis and other cattle scourges, regarded as a problem of national economy. The proposals of the Survey Committee have been debated up and down the country, and I think you will not expect me to renew consideration of them at this meeting. My intention to-day is to look at my subject from the viewpoint of an individual veterinary surgeon speaking to other veterinary surgeons, all of whom encounter the condition in their daily work.

Various types of bacteria are concerned in the causation of mastitis, each affecting the udder in its own special manner. The organisms most commonly implicated are the streptococcus, *Corynebacterium pyogenes* and the staphylococcus. I am excluding tuberculous mastitis from present consideration.

Reports vary somewhat as to the relative frequency of these organisms. The Survey Committee has estimated that *Str. agalactiae* is responsible for 80 to 90 per cent. of all cases of mastitis, including sub-clinical cases. Minett and his associates, quoted by Gaiger and Davies, found the percentages to be approximately: streptococci 73, *Corynebacterium pyogenes* 19, staphylococci 5 and *Bacterium coli* 3. In *The Veterinary Record* of March 23rd, 1940, a Canadian investigation was reported. Five hundred and ninety-four cows were examined, and of the cases of mastitis which were found, streptococcus was responsible for 156, staphylococcus for 50 and *Corynebacterium pyogenes* for 3. The large proportion of staphylococcal and small proportion of corynebacterial cases is, I think, not in accord with general experience in this country.

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The figures that have been published from time to time on the prevalence of mastitis refer chiefly to chronic streptococcal mastitis, the commonest type by far. A brief glance at these figures will be sufficient to show how vast is the extent of this condition. By investigators in Germany, Canada and England respectively the incidence among dairy cows has been found to be 33 per cent., 34·2 per cent. and 38·3 per cent. In the English herds investigated the degree of infection varied between 10 per cent. and 71 per cent. About a year ago I took milk samples from a herd of 43 cows, and laboratory examination showed that not a single quarter in these 43 cows was free from infection. What all this means in reduction of milk yield can only be a matter of estimate, but there has been recorded a comparison in this respect between infected and non-infected cows in three herds, showing the loss of expected milk yield due to mastitis to be 10·8 per cent., 16·5 per cent. and 19·5 per cent. respectively. The estimate published by the Survey Committee is that 25 per cent. of cows in milk are affected with mastitis, with a consequent loss in milk yield of 12 per cent. When they claim that these are conservative figures I think we must agree that the claim seems to be justified.

Four groups of streptococci are now generally recognised as being responsible for mastitis.

Group 1, the *Streptococcus agalactiae*, causing the widespread, chronic contagious mastitis.

Group 2, which causes an acute sporadic mastitis.

Group 3, said to be somewhat less acute than Group 2, but also sporadic in occurrence.

Group 4, which is believed to be related to or identical with the *Str. pyogenes* of humans. Infection in this case may be from a human source, and, when it occurs, the condition may then in turn bring about milk-borne epidemics of scarlet fever and sore throat in human beings.

Staphylococcus aureus causes a form of mastitis which may be either acute or chronic.

Corynebacterium pyogenes is the causal organism of that seasonal scourge, summer mastitis.

The presence of bacteria in the udder, even of these pathogenic bacteria I have mentioned, does not necessarily result in mastitis. Healthy udder tissue appears to have a definite tolerance towards the invaders, because bacteria are regularly found in milk drawn with all precautions of sterility from udders showing no sign of disease. Circumstances, however, may arise which precipitate mastitis by lowering the resistance of the tissues in the face of bacterial invasion. Injuries to the teats or tugging

at the teats when milking; overstocking, by stretching of the tissues; driving the cow too fast and causing the udder to flap against the legs; perhaps incomplete stripping; too high a vacuum in milking machines; chills, or the debilitating effect of disease in other organs—any of these may play a part in bringing about the onset of mastitis. In my neighbourhood, probably elsewhere as well, farmers have always talked of a "stomach weed," meaning, of course, mastitis arising from some disorder of the stomach, and I used to scoff at that idea. I don't scoff now. Loss of general systemic tone on account of digestive upsets might easily make the udder more vulnerable to infection.

Quite recently an interesting suggestion has been put forward, that cows may be subject to a non-specific or non-bacterial mastitis, similar to the condition which is now recognised in women. As it occurs in humans, this is a chronic mastitis seen chiefly in childless women of middle age, and sometimes in females at puberty, and it is believed to be due to some hormonal imbalance operating through the anterior pituitary body. There is proliferation of intra-lobular connective tissue, with pressure atrophy of the acini, and at times the formation of small cycts and papillomata, all this making the mammae nodular to touch. Except for the absence of bacteria and leucocytes the pathological picture is said to differ little from that of a chronic bacterial mastitis. It cannot yet be said that the existence of this condition has been proved in cows, but if it were established it is reasonable to suppose that the udder would be in consequence less resistant to damage by bacterial action.

Probably the most important of all predisposing causes is that the modern dairy cow is a highly specialised product of man's intervention in the processes of evolution. More and yet more milk, udders larger and more active to produce it—not to satisfy the modest, frequent requirements of a calf, but to meet the much more imperative demands of the lords of civilisation—that is what is asked of the dairy cow, and the milk is left to swell the udder for 12 hours at a time. I am not criticising our modern ways, but if mastitis is part of the price which is exacted, well, it hardly seems a matter for wonderment.

Streptococcal Mastitis

Of the various forms of mastitis it is generally agreed that streptococcal mastitis is the most important, and with your consent I propose to deal with that first.

During recent years much work has been done on chronic contagious mastitis. This form, in its immediate effects, is less spectacular than most of the others, but the vast losses it entails make it by far the most important. It is caused by the Group I streptococcus, *Streptococcus agalactiae*.

Two features combine to give this form of mastitis outstanding importance; its contagiousness, and the fact that in many cows it exists unsuspected, without the exhibition of noticeable clinical symptoms. Cows harbouring the infection in this latent form are always liable to have a flare-up into a clinical mastitis, and in addition they are carriers of the disease, a perpetual danger to other cows. In a typical outbreak, therefore, contagious streptococcal mastitis is presented in both clinical and non-clinical forms. There is little systemic disturbance with the clinical type, but the condition is persistent, or if it abates for a time a recurrence follows, and loss of function of the affected quarter or quarters is the normal outcome.

The disease is much more common in older cows than in young ones, but even heifers do not always escape. In heifers the incidence has been placed as high as 10 to 15 per cent., figures which, I must say, are somewhat higher than I would have expected.

It is thought that infection usually occurs by way of the teat, but perhaps for this it is essential that the teat should be in some way bruised, cracked or otherwise damaged, because the experimental coating of healthy teats with heavy suspensions of streptococci has singularly failed to produce the disease. If the outside of a teat were contaminated, however, it might be that the act of milking, by alternately opening and shutting the teat canal, would allow some of the bacteria to be sucked in. The possibility cannot be ruled out, either, that infection may be conveyed to the udder from a focus in some other part of the body, but in view of the contagious nature of the disease I think that would be a rather rare event.

Infection is commonly transmitted by milker' hands, contaminated teat cups of milking machines and soiled floors or bedding. We have all seen, too, the assiduity with which flies apply themselves to a sore teat; they also may be agents of transmission.

So far as is known, *Streptococcus agalactiae* is purely a parasitic organism. Apparently it can live outside the animal body for a period which may extend to months, but in order to thrive and multiply it requires its animal habitat.

Obviously, when dealing with an outbreak of this disease it is not enough merely to eliminate or try to overcome the clinical cases. In the attack, although the initial thrust may be directed against the clinical cases, a subsequent mopping-up process among the non-clinicals is just as essential to bring the operations to a successful conclusion.

The first step, of course, is to verify the diagnosis by demonstration of the bacteria, and then to find the extent to which the disease exists. This latter purpose involves examination of quarter samples from the udder of every milk cow in the herd. It is generally agreed that laboratory examination of the samples is the best method, but since the available laboratory facilities are insufficient for such examination on a nation-wide scale, various alternatives are recommended. Palpation of the udder alone, although it appears to be practised successfully in America by Udall and his colleagues, will, I am afraid, fail to detect a considerable proportion of the sub-clinical cases. In this country more reliance is placed on the regular use of the strip-cup, or of such chemical means of detection as brom-cresol-purple or brom-thymol-blue papers, but I am sure that both of these fall short of the accuracy of proper laboratory investigation. If suitable laboratories do not exist everywhere, at least they exist in some places, and where they do I urge that full use should be made of them.

There is one point that is not quite satisfactory, even with bacteriological examination. Not every cow discharging streptococci in her milk is regarded as being affected with mastitis; I refer of course to cases where no other suspicion of mastitis is attached

to the cow. Unless the bacteria present exceed a certain number the cow is not regarded as being infected, and that number has been fixed, somewhat arbitrarily perhaps, at 50 colonies per plate of culture medium. Certainly there are good reasons for this, but it seems possible that a cow just below the permitted figure may provide an inroad for infection to others.

Measures for the control of the disease include separation as far as possible of infected from non-infected cows, the inauguration and maintenance of a strict hygienic routine, the adoption of suitable treatment of affected animals, and periodic check-up tests of the milk.

The ideal method of segregation is, of course, the use of separate byres if they are available, but if they are not (and that means in the majority of farms) the cows should be arranged systematically in the byre, clinical and heavily infected cases at one end, those with lighter infections next, and free cows at the other end. In the main heifers are free of mastitis and should be placed among the non-infected cows. It is wise, however, to test their milk as early as possible after they calve. Some of the clinically affected cows will have two or even more quarters involved, and should be disposed of without delay. It is not unusual to find that the grossly altered milk of severe cases shows few or no bacteria, but that condition is not normal or constant. I recall one such cow where a sample of the udder discharge proved to be quite negative, and a second sample taken a week later contained enough streptococci to provide smears for a large class of students.

In some very heavily infected herds, where the proportion of clinical cases is likely to be high, it may even be necessary to try to build up a clean herd from the heifers, in much the same way as one builds up a tubercle-free herd.

In these days of labour shortage I have not the temerity to suggest separate milkers for the infected and non-infected groups, but when hand-milking is employed it is essential that the free cows should be milked first. Where a milking machine is used, consideration should be given to the feasibility of using it only on free cows and milking the others by hand, or as an alternative to that, separate teat-cup clusters could be kept for the infected animals. The operation of the machine needs careful watching, so that it may not be left sucking away at an empty udder and causing damage to the tissues which would render them more prone to infection. Similar injury may result from too high a vacuum pressure in the machine.

The old practice of drawing the first few jets of milk, or even stripping a weeded cow, on to the byre floor seems now, I am glad to say, to be falling into desuetude. It is an evil habit which must be rooted out. Short clipping of the hair on the udder, on the other hand, ought to be heartily advocated. In the best herds it is regularly done, and while its value may be difficult strictly to assess, I cannot but think that the effect will be beneficial.

Nothing is more important than the thorough cleansing of the milkers' hands, the cows' udders, and the cups of milking machines. For these purposes the chlorine disinfectants when used in suitable dilution, usually 2½ oz. in 2 galls. of water, meet he requirements of being effective against streptococci without tainting the milk. At least two painfuls of the solution should be provided and several udder cloths, so that each cloth will be soaking for a sufficient time. Needless to say, a different set of cloths should be kept for the infected portion of the herd. Before milking begins, the milkers should thoroughly wash their hands, and after rising from each cow should rinse the hands in the disinfectant. Teat cups, on being removed from each cow, should be rinsed in clean water and then dipped in the chlorine solution.

All these precautions will fail of their purpose if they are not observed thoroughly and unremittingly. I have always maintained that it is the duty of the veterinary surgeon not merely to tell the stockowner what he must do, but to explain to him as fully as possible the nature of the disease, so that he will understand why he has to do so-and-so. Only in this way can the intelligent co-operation of the owner be assured. And that applies to other conditions besides mastitis.

Now we come to the question of treatment. I have already told you, as you will remember, that I hold no original views on my subject. For a number of years I have treated my cases very much on the lines recommended by the Survey Committee, and I am satisfied that it is the best method that has yet been devised. As you know, there are really two treatments suggested, and to obtain good results it is necessary to select the treatment that is suitable to each type of case.

In clinical cases the oral administration of sulphanilamide has given many spectacular results. It must be admitted, however, that the first high hopes of sulphanilamide therapy have not been quite fulfilled. There was found, for instance, a disconcerting proportion of relapses, and it was discovered also that although the milk appeared normal, the udder was by no means cleared of the bacteria. Subclinical cases, too, where the milk is little altered, are singularly unresponsive. Still, in spite of these limitations, sulphanilamide has definitely established itself in cases showing definite clinical symptoms with marked alteration in the character of the milk. The dosage is of importance, because a sufficiently high blood-concentration of the drug has to be reached and maintained. A first dose of 3 oz. is now generally given, followed by 1 oz. three times a day, dividing the day evenly, until 1 lb. in all has been given. At one time an initial dose of 6 oz. was advised, but that quantity often had an upsetting effect on the cow's system, with diarrhœa, inappetence, diminution of milk yield and weakness of the hind legs. Experience has shown that the smaller initial dose gives equally satisfactory results, without the unpleasant accompaniments. Sulphanilamide, being only slightly soluble, should be administered shaken up in a pint or so of water.

For the type of case in which sulphanilamide is ineffective, that is, the case in which streptococci are present in the milk in sufficient number to warrant a diagnosis of mastitis, but with little or no naked-eye alteration of the milk, infusion of the udder with a suitable disinfectant is the treatment now widely favoured. Not every disinfectant meets the obvious requirements of being lethal to streptococci and reasonably non-irritant to the delicate tissues with which it is brought into contact. So far as present knowledge goes, two preparations above all others

fulfil the necessary conditions, acriflavine and entozon, and these only when used in proper dilution and under other strict precautions. In clinical cases, where sulphanilamide gives such good results, udder infusion is comparatively impotent. On the other hand, while sulphanilamide merely clears up the milk, acriflavine and entozon, properly used in suitable cases, often render the udder completely free of bacteria. The choice between acriflavine and entozon is largely a matter of individual experience. For a number of years past I have chiefly used acriflavine, because entozon in my hands produced rather startling, if temporary, changes in the milk, which occasioned some alarm to the owner. Sometimes I have thought, however, that where the milk was slightly altered in character, entozon was the more effective of the two.

The strength of solution to be injected is most important; 1 in 10,000 of acriflavine and 1 in 1,250 of entozon. To use anything stronger is, in my opinion, to invite disaster. The solution should be made up with boiled and filtered or distilled water, and injected at blood heat, no more. As the capacity of the udder varies in different cows and at different stages, so must the quantity to be injected vary. The general principle is to fill the udder or quarter to a moderate degree of firmness without unduly stretching it, and that is usually achieved by injecting for each quarter about a pint or even less, up to a pint and a half or a little more. The udder should be thoroughly stripped out first, and following that, to make the emptying more complete, it is a good plan to inject about 200 c.c. of the solution and draw that out again. Then the full quantity is injected, and the udder gently massaged for a minute or two to distribute the solution. If the cow is in milk the solution should be drawn off as completely as possible five minutes at most after it has been injected, but if the infusion has been made in a dry cow it should be left in for 24 hours. In a milk cow the milk is unusable for about three days: with acriflavine, on account of the colour, and with entozon, because it may also be curdled. In making the infusion strict cleanliness must, of course, be observed. The teats and udder must be washed, teat needles sterilised, and all containers made scrupulously clean. Some people advise allowing the liquid to flow into the udder by gravitation, using a funnel attached to the teat needle by a rubber tube long enough to let the funnel be held about shoulder high. That method is slow, however, often taking two minutes or more to complete the infusion for each teat, and where the solution has to be withdrawn again in five minutes the time schedule is badly upset. The best method, I think, is to connect the teat needle with a container on the principle of a calcium injector and get the solution quickly into the udder. In my experience this treatment has often been highly beneficial, and the good effect is increased if a second injection is made a week or ten days later. With cows in a late stage of lactation it is often better still to defer treatment until they are dry, when the solution can be left in the udder for 24 hours. If a large number have to be treated, they should of course be done in batches, so that the milk yield of the herd will not be seriously curtailed. To summarise, in an outbreak of contagious mastitis there will be a number of clinical cases, and perhaps many non-clinical cases: sulphanilamide gives good results in the clinical cases, but not in the non-clinical, while with udder infusion exactly the opposite applies. Fairly often it is an advantage to combine the two treatments, giving sulphanilamide in the acute stage to make the milk usable, and then, when the cow goes dry, injecting entozon or acriflavine to render the udder sterile.

When all this has been said I do not wish to imply that the problem of contagious mastitis has been solved. Disappointments come, and I have had them. Some outbreaks obstinately defy our efforts, although often that is because the owner has not given the wholehearted co-operation without which success is impossible. What I do think is that these lines of treatment have taken us a great step forward, and that improvements will be effected to take us further still.

As having a bearing on that, I should like to draw your attention to an abstract which appeared in *The Veterinary Record* of Saturday, September 27th. In it are given the results of some work on streptococcal mastitis with injection *via* the teat canal of silver oxide, 1 per cent. to 10 per cent. suspensions in light mineral oil. The number of cows experimented on was not large enough to allow general conclusions to be drawn, but investigations are being continued. In one set of experiments 12 quarters, treated daily for several days, were freed of *Streptococcus agalactiae* for periods varying from 11 to 37 days. In other experiments covering 67 quarters, 88 per cent. were freed of *Streptococcus agalactiae*, and of the quarters showing clinical symptoms, about 50 per cent. were cured. The number of clinical quarters is not stated. From three to five daily injections were given, and the treatment caused for a time swelling of the udder and altered milk. Certainly, this is not much to go on, but of many attempts some will lead to something.

A number of years ago, like other veterinary surgeons, I used for a time a preparation of silver injected by means of a long needle directly into the udder tissue in a number of places. My results were variable, but in a proportion of cases by no means negligible, recovery followed the treatment. I must confess that I used it impartially on all types of mastitis, a catholicity of procedure which may have had something to do with the number of failures. At the same time, I think there are intrinsic defects in this method.

I have nothing definite to say about vaccines. Present opinion is decidedly sceptical, and for myself I must admit to being undecided in the matter. Sometimes, following the use of an autogenous vaccine in a particular herd, I have seen a definite reduction in clinical manifestations, while at other times it has seemed just a waste of time and money. Doubtless no two outbreaks are completely alike, and it may be that the vaccines vary too. As to that last I am not competent to say.

Mastitis due to the other groups of streptococci is, as I have already said, usually acute and sporadic. In commercial herds the veterinary surgeon is not usually consulted about such cases, a circumstance which, I am afraid, reflects the owners' somewhat disillusioned outlook on our activities. In regard to mastitis, we have much to live down.

Other Types of Mastitis

It is fortunate that staphylococcal mastitis is comparatively rare, for it is a most unsatisfactory condition to treat. Acute and chronic forms of it are seen. The acute form is of excessive severity, with great pain and swelling of the udder, drastic changes in the milk, and a devouring toxaemia. There is a great tendency to necrosis, resulting either in the death of the cow or in sloughing of the diseased part, even of a whole quarter of the udder. Not infrequently invasion by putrefactive anaerobes supervenes on the necrosis, causing gangrene and, of course, death.

Almost the most interesting thing to be said about chronic staphylococcal mastitis is that all, or nearly all, cases of the kind that used to be regarded as udder actinomycosis are now believed to be due to the staphylococcus. There is as a rule no systemic disturbance, and the condition may for long pass unnoticed.

I do not know of any even moderately satisfactory treatment of acute staphylococcal mastitis. In some parts of the country both the acute and the chronic forms appear enzootically among ewes. Some experimental work has been done which indicates that a formolised or alum-precipitated toxoid might prove successful in preventing the disease in sheep, but I cannot see that the method would be applicable to cattle, considering the sporadic nature of the disease.

Of the next, and last, type of mastitis on which I propose to speak, mastitis due to *Corynebacterium pyogenes*, although much is known, much remains obscure. Almost invariably, for instance, it attacks dry cows and even heifers, at grass during the months of July, August and September, receiving in consequence the accepted descriptive name of "summer mastitis." Compared with streptococcal mastitis, little work has been done on this form of disease, but it constitutes a formidable problem nevertheless. The losses occasioned by it are by no means light, and they acquire a spectacular quality by being crowded into one brief season. In some years and some districts the prevalence is less than in others. Warm, sultry weather and pastures sheltered by belts of trees seem to dispose to a heavy incidence, and the season and general circumstances undoubtedly give some support to the view that infection is conveyed by flies. The condition is too well known for me to waste time in describing symptoms, except to say that, while mild or chronic cases do occur at times, corynebacterial mastitis as we usually see it is a condition of major severity, often affecting a number of animals grazing together, with a high mortality, and always total loss of any affected quarter. Why this form of mastitis should exhibit so striking a preference for dry cows I am unable to say. Milk for a short time inhibits bacterial growth, and perhaps the corynebacterium is peculiarly sensitive to this. Whatever the explanation may be, it appears that the organism needs undisturbed possession of the udder for its highest pathological development to take place. Uncertainty also exists as to the manner in which the disease is spread. I have mentioned flies as a likely vehicle of infection, and when one sees a cluster of flies gormandising on the drop of stinking matter that befouls the end of an affected cow's teat, it is impossible to escape the conclusion that they are likely to be carriers of the disease. Not to be overlooked, however, is the fact that corynebacterium is a rather common casual agent in calf diseases, and here again, as in the streptococcal condition, it may be that infection remains latent over a long period, to break into activity when favourable circumstances arise. I think that view has not been carried beyond the speculative stage, and it certainly leaves much to be explained.

Treatment has not been satisfactory. In this respect a measure of our non-success is the frequency with which farmers send their cows to the slaughterhouse as soon as they recognise the symptoms. In my experience neither sulphanilamide nor udder infusion is of the slightest benefit, but at a meeting of the North of Ireland V.M.A., reported in *The Veterinary Record* of November 16th, 1940, several members spoke of good results being obtained from the administration of M & B 693. The doses given were 50 to 75 grammes to begin with, followed by 25 grammes twice daily for three days. It did not appear that functional activity of the udder was quite restored, but only that there was speedier return to general health, with diminished mortality rate. In this, as in most other udder infections, there is general agreement that frequent stripping is a valuable aid to treatment, hourly stripping if possible. If the discharge is very thick or lumpy it is often advisable to slit the teat sphincter to facilitate the stripping. Amputation of the teat is sometimes advocated, since it permits spontaneous drainage to take place. Against that advantage there is the grave objection that when the teat is amputated infective material is freely scattered wherever the cow goes. Hot Epsom salts packs are sometimes applied to the udder, or kaolin poultice or various liniments, but I doubt if they do any good.

Considerable ingenuity has gone to the devising of methods of prevention. Affected cows should, of course, be isolated. Farmers who have cows drying off as the season for summer mastitis approaches often try to keep them going on in milk until the danger is over. Most of the preventive measures are based on the belief that the disease is carried by flies, and so they take the form of the application to the teats of reputed fly repellants, or of agents for sealing the teat canals. Tar, or ointment containing it, undoubtedly helps to keep flies off, as well as closing for a time the entrance to the teat. Collodion is extensively used as a seal, and one farmer whom I know paints the ends of the teats with quick-drying varnish. Before any of these things are applied, the teats should, of course, be thoroughly cleansed and dried. With a disease so variable in its incidence, and owners all enamoured of their own particular devices, it is not easy to assess the value of these preventive methods. I imagine that where they all fail is in lack of thoroughness in carrying them out. For closing the teat canal to infection the best method by far is that introduced many years ago by Mr. John Brown, of Invergordon. It consists of injecting through the teat into each quarter 1½ oz. of a suspension of bismuth subnitrate 1 part, with a small quantity of iodoform, in 8 parts of sterile liquid paraffin. As the suspension settles in the udder, the bismuth and iodoform gravitate into the teat channel, filling it completely with effective non-irritant antiseptic. The injection should be given to

all dry cows just before the mastitis season is expected. I am convinced that, when given in time and repeated when necessary, this is a most useful preventive, and its success indicates that at least in a proportionate number of cases infection is by way of the teat canal. From that it is reasonable to believe that flies may be the vectors.

Recently, some work has been done with a toxoid which, I understand—although I have no detailed knowledge of it—gives promise of good results both in prevention and in treatment.

Corynebacterial mastitis has long been a reproach to us. Its dramatic appearance and destructive course force it on the notice of stockowners, and economically it must be of quite considerable importance. A fatalistic acceptance of it is a luxury which we simply cannot afford.

Treatment of acute mastitis in general has one great disability imposed on it by the very nature of the disease. While some cases, and this applies particularly to streptococcal mastitis, are mainly catarrhal in character, there are others in which the disease is violent and rapidly progressive, bringing about early destruction of the milk-secreting cells. If by success in treatment, and it is the only complete success, we mean not only recession of the inflammatory process, but restoration of glandular function, that is something which often is, and will perhaps remain, unattainable. The sudden furious onset of a really severe mastitis is almost awe-inspiring, and irreparable damage is quickly done. How often we are content to see the quarter safely fibrosed, atrophied and functionless. In such cases I see no prospect of any treatment being effective speedily enough to prevent this cell-destruction. On the other hand, I feel convinced that improved methods of prophylaxis will be devised likely to diminish the incidence of the disease. Fortunately, these excessively severe cases make only a small minority in the total of mastitis, and their occurrence gives us no warrant for pessimism. The whole problem is being tackled by capable workers; practitioners are eager to give field trial to new methods which promise improvement; from all this progress is sure.

To conclude, my aim has been no more than to offer you some of the facts and some reasonable reflections on them. I hope I have not fallen too far short of its achievement.

Discussion

Mr. T. M. Mitchell thanked Mr. Campbell for a most useful and instructive paper. Though the author had admitted that the subject-matter was not new, it was meticulously arranged and most effectively delivered. Mr. Mitchell then asked the lecturer's opinion on the spread of mastitis by milking machines, saying that he had seen a spectacular outbreak of mastitis affecting 50 per cent. of the cows and that he thought that spread had been brought about in this herd by the milking machine. Immediately hand milking was resorted to, then spread was checked. Also, did Mr. Campbell consider that the four types of streptococcus varied in their invasive powers, or did one just classify them together as streptococcal mastitis?

Mr. Campbell, in replying, said that milking machines might be an important source of spread, but he thought that spread was equally likely to occur from hand milking, and it was immaterial which method was used, provided in both cases due care was exercised. The four groups of streptococci represented really an academic division but the characteristic difference was that, apart from group 1, the others were usually sporadic in occurrence. Mr. Campbell recalled an outbreak of mastitis with very serious effects including two deaths. This was caused by a haemolytic streptococcus which did not belong to group 1. The treatment of these types of mastitis was identical.

Mr. J. P. Pickering, having thanked Mr. Campbell for his paper, said that with regard to the use of toxoid in the prevention of staphylococcal mastitis he thought this line of treatment useful. The trouble was that usually when seen by the practitioner tissue destruction had commenced, but he thought that toxoid injections helped to limit the acute symptoms. He agreed that Brown's method of treatment for mastitis in dry cows was extremely satisfactory. He had also tried silver preparations for chronic mastitis, and despite apparently good results at first the methods seemed to peter out and he had now discarded this technique. Mr. Pickering then asked Mr. Campbell details about the technique for udder irrigation. How did he carry distilled water about? [Mr. Campbell: "I never use it."] Was he to understand that sulphanilamide was given per os in chronic cases of mastitis? In these cases there was no swelling and no fever, quite distinct from the acute case. Could good results be expected from sulphanilamide in chronic cases? Mr. Pickering said that he was also interested in what had been said about "stomach weed": he thought that this pointed to the conclusion that much more detailed work was needed on the subject of mastitis. Perhaps *Str. agalactiae* was a natural vegetative organism and harmless until some other condition allowed it to act. He recalled a herd of 19 cows all of which were affected. Treatment was quite ineffective. Much more knowledge was needed on the whole subject. Mr. Campbell, in replying, stated that he had never used toxoid but for treatment he would be rather sceptical. His experience with silver compounds was similar to Mr. Pickering's. Probably his early failures might be glossed over owing perhaps to unfamiliarity with the new technique, but later when these difficulties were overcome, one had to admit that the silver preparations seemed of low effectiveness. The effect of sulphanilamide on old-standing cases was somewhat difficult to assess on account of the difficulties of differential diagnosis. Nevertheless, it is a fact that many cases did respond to it. Fairly heavy infection of the udder was possible with no disease but where a herd was badly affected such animals might in reality be sub-clinical cases.

At the invitation of the Chairman, Mr. Steele-Bodger, at this stage, briefly summarised the arguments in favour of the acceptance of the Survey Committee's scheme for the control of some of the major diseases of dairy cattle.

Mr. H. B. Allan complimented Mr. Campbell and stressed the importance of educating farmers with regard to general herd hygiene and animal management.

Mr. J. D. Peele said that Mr. Steele-Bodger's remarks had greatly reassured him on many points. He felt quite sure that with this scheme, imperfect as it might be, the profession could do a very great deal to help in producing a greater quantity of marketable milk—and, after all, this was the primary object of the scheme. Furthermore, if the profession did not take up the fruits of recent veterinary research on this problem it was quite likely that the knowledge would be applied by other people and the profession would be left standing. The question was sometimes asked why the profession had not eradicated tuberculosis? The answer to this could not be simply stated. Anyhow, the question concerned the activities of the Ministry of Agriculture's whole-time staff quite as much as the practitioner. He was interested in what Mr. Campbell had said about mastitis in the human subject. A farmer had stated that he had seen an attack of mastitis occur during oestrum: why, one did not know, but the point might be worth investigation. Had Mr. Campbell ever met with mixed infections and what effect had a mixed infection on treatment?

Mr. Campbell replied, saying that he was interested in the question of non-bacterial mastitis. It had been definitely suggested that a non-specific form of mastitis did occur and might be of importance. He had not, to his knowledge,

come across mixed infections but confessed that the diagnosis had not always been checked up by laboratory tests. He understood, however, that in streptococcal mastitis it was rather unusual to find a mixed infection.

Mr. MITCHELL asked if he could be informed what was meant by " black spot " as applied to mastitis.

Mr. LYLE STEWART thanked Mr. Campbell for a most instructive address. It was of great interest to hear that Mr. Campbell had for some time been treating mastitis in much the same way as was now recommended by the Survey Committee, and that he was fairly satisfied with the results of treatment. What could be done in one part of the country was equally applicable to another part, and he thought that there was an overwhelmingly strong case for putting the scheme into operation at once. Time would soon show the value of the scheme in practice and no doubt the technique would be modified according to experience. The great thing was to have plenty of people interested and working on the problem. This was how progress would be made, and meanwhile the profession would be contributing to the conservation of the nation's milk supply.

Mr. J. P. PICKERING admitted that he had been somewhat overcome by the rhetoric of Mr. Steele-Bodger [Mr. Steele-Bodger : " Logic, not rhetoric ! "], but at the same time he was not very hopeful of many farmers joining the scheme in its voluntary form. Further, if no farmers joined it would the profession not be in a worse position. What about the tuberculosis scheme ? Mr. Pickering also stated that he had used the Norden Infusion Apparatus but had discarded it. He thought that an infusion apparatus must have some pressure behind it.

Mr. STEELE-BODGER, in the course of his reply to the points raised in discussion on the Survey Scheme, dealt paragraph by paragraph with Mr. Pickering's letter to *The Veterinary Record* (*Vet. Rec.* **53.** 573).

Finally, he said that he noted that Mr. Pickering had admitted that he liked plenty of time to think things out and he assumed, therefore, that the views which he had expressed in his letter to the *Record* were by now out of date, and that at this time he was probably in favour of the scheme.

Mr. PICKERING replied that he would not admit he was convinced, but he was so far impressed that he would not vote against the scheme. Mr. POWLEY stated that " black spot " occurred in Yorkshire and that, speaking from memory, he thought Mr. Hignett had found it to be due to *Str. agalactiae*.

Mr. OLIVER said that much greater laboratory facilities would be needed. He was much more pleased with the scheme having heard the explanations which were given that afternoon. He thought that members in this Division would be able to get the new scheme going and repeated that he hoped that practitioners would get much co-operation from the laboratories. He also stated that sampling was frequently rather a laborious business.

Mr. CAMPBELL replied that sampling was not so laborious as it might appear. One should make a habit of carrying a number of sterile bottles. With regard to laboratory facilities, some districts he knew were badly served but this would require to be remedied. No longer could we afford to take the view that the profession is split up into water-tight compartments and that the Jews have no dealings with the Samaritans. Some years ago the N.V.M.A. urged provision of improved laboratory facilities, though not specifically for mastitis, and his case was that they were absolutely essential to the furtherance of eradication work, but at that time the Ministry had preferred centralisation. He quite agreed that the scheme could never be a great success without the enthusiastic co-operation of all workers in the field, and laboratory facilities must be made available. It was a fact that some cases of mastitis very quickly responded to treatment and others did not. This probably depended upon many factors, and the virulence of mastitis varied quite a lot. Nevertheless, if the treatments recommended were carried out he thought that the net result would be a valuable increase in the output of marketable milk.

THE VETERINARY RECORD

DECEMBER 27TH, 1941.

THE THERAPEUTIC RESEARCH CORPORATION

OUR readers will have noticed in the professional and in the lay press the announcement of the formation of the Therapeutic Research Corporation of Great Britain Limited. It was directed to inform the veterinary profession and allied professions, of an arrangement to rationalise research on selected subjects in the field of the British Fine Chemical Industry. The co-operating firms also intend to pool their manufacturing facilities for the development of the results of their combined researches.

The founder companies are five of the largest and most developed interests in this field. We may express the hope that the T.R.C. will be expanded to include all that is best in the industry and rise to a position which will at least rival that of the combined German interests which occupied such a prominent place in the production of new remedies in the pre-war days. This German combine undoubtedly did much valuable research work and saw that the clinical results of its efforts were fully explored. Rationalisation of research and of production was the secret of this success.

Essentially this new Corporation will leave the constituent companies as entities, still free to continue their special activities and to compete in the markets of the world yet linked in the prosecution of research and the development of new products. Each of the founder companies has long had established research facilities ; each has contributed much to our present knowledge of therapeutic products. In the past they have been engaged independently in the same studies, employing the same type of trained mind, the same type of laboratory facilities and substantial sums in capital and maintenance expenditure. Duplication of research is often advantageous ; without collaboration it is wasteful and results in restriction of the field of endeavour. In a wide and rapidly expanding sphere it is surely better that one team of workers take a special line, leaving to others constructive criticism while primarily engaged in the study of an allied subject. The T.R.C. envisages a pooling of resources which will result in more rapid advancement towards the achievement of high purpose in this field. It is its expressed intention to endeavour to enlist the co-operation of workers in more " academic " fields, bringing the results of this wider research to the benefit of the community much earlier and in a more fruitful way. Some academic workers have been somewhat shy of co-operation with commercial interests, fearing some stigma from close association with an individual firm. Now that several large manufacturers have shown their desire to co-operate with one another in research, it is to be hoped that

academic workers will feel freer to ally themselves with industrial research through the channel now provided. Only by such combined efforts can Britain make her proper contribution to pharmacology and therapeutics and cease to be dependent on foreign countries for new drugs.

The announcement that products evolved as the result of research sponsored by the Corporation will be marketed by the constituent firms under a common name is important. The growing tendency to market the same therapeutic substance under a variety of trade names has led to much unnecessary confusion. It has crept into the field of biological products. While this Corporation may not find it practicable to deal with existing conditions, it may, in the co-operative spirit which is its basis, do something. Otherwise, some body with full authority must soon take active steps to deal with the difficulties which trade names have created.

It is encouraging that this Corporation has, at the outset of its career, recognised the place which the veterinary profession must occupy in aiding research work and the application of new discoveries. We believe the T.R.C. to be well conceived; we wish it success.

FLOWERING OF A HEALTH SERVICE

Under the above title a speech by Dr. A. W. Lipmann-Kessel is reported in the *Lancet* of November 29th. He describes the development of the health services of Russia from the time when they were founded in 1917.

In the last century Virchow said that "Medicine is a social system" and in 1919, when typhus was rampant and the louse was the greatest enemy of the people, the slogan "The health of the people is the task of the people themselves" was adopted. School children are now taught public health as part of their curriculum and this education is also extended to all sections of the population.

Health centres staffed by a group of doctors, specialists and nurses, and equipped with facilities for diagnosis supply every kind of medical treatment, free of cost, to every citizen who needs it. There are also numerous health centres in the factories and on the collective farms, and the promotion of doctors depends on the standard of health among workers in their charge, and on a falling level in the time lost at work.

Between 1919 and 1923 the people were impoverished, famine-stricken and disease-ridden; and on this foundation one of the greatest experiments in health services was built. In the U.S.S.R. a man returning to work after illness is examined at the factory clinic and is given a suitable job for a suitable number of hours daily and the work is graded as the man recovers.

Soviet research on the storage of blood has been of great service to us in this war, and the Russians have also perfected a technique of blood transfusion for use in the front line and use aerial transport for the wounded.

Pavlov described Russia as the only country in the world where the research worker was unfettered by economic ties and this principle is carried into medical education. Medical students are chosen from amongst the best students, and they then receive free education and are paid like any other Soviet worker.

During the last ten years the number of doctors has been doubled.

CLINICAL COMMUNICATIONS

Suspected Cases of Grass Disease in Northern Ireland

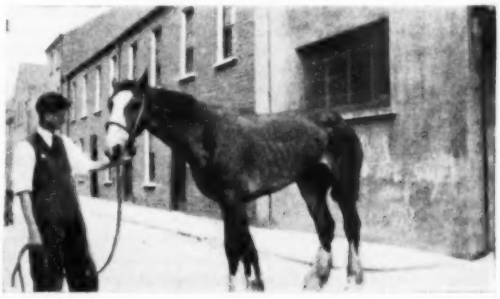
I

A. McFARLANE, M.R.C.V.S.,
Belfast

On June 23rd, 1941, I consulted Mr. H. G. Lamont about a condition in a three-year-old gelding at Ballynahinch, which appeared to me to be affected with grass disease. Mr. Lamont visited the case and agreed with this diagnosis.

History.—The animal had been in good form during the spring ploughing and was turned out to grass. Some time about the first or second week in June he was noticed to be salivating, standing with his tail between his legs, sweating about his hips, and shaking. The owner brought it in from the grass but found the animal unable to work.

I found the horse already very much tucked up, as shown in the photograph. There was difficulty in swallowing. The animal would munch at his oats as if feeding, but the quantity did not decrease. His mouth was very dry. When offered grass he took this into his mouth but fed very slowly and at intervals made a peculiar gulping movement in which his neck muscles contracted as if making a forcible attempt to swallow. Patchy sweating and tremors of his shoulder muscles were noted, but there was no elevation of temperature. Little manure was passed and this principally in the form of small hard pellets coated with mucus.



Mr. P. L. Shanks, of the Veterinary Research Division, and Mr. Lamont again saw the horse with me on June 27th, 1941. Mr. Shanks, who had just returned from a visit to Scotland where he had seen some cases of grass disease with Mr. Rice, Montrose, had no hesitation in diagnosing the case as one of chronic grass disease.

The horse was removed to our yard on June 28th. At this time he had difficulty in swallowing even liquids, but later either because of a slight improvement in his condition or in consequence of having learnt the easiest way to swallow, he could manage to get down plenty of liquid and a fair amount of soft grass. On two occasions he was given two large boluses of linseed meal; their passage down the oesophagus was extremely slow, each taking about ten minutes from the time they passed over his

pharynx until they disappeared at the entrance to his chest. When feeding he would move forward, eat about four bites, then invariably back into a corner, stand about ten minutes, gulping at intervals, and then resume feeding.

His condition slowly deteriorated in spite of treatment, including arecoline, pilocarpine and carbamylcholine, and on July 11th he was unable to rise and was destroyed.

The pilocarpine and arecoline injections made his mouth only slightly damp and moved his bowel.

Post-mortem Examination.—The carcase was emaciated and tucked up like a greyhound. The viscera appeared to have shrunk to about one-fifth the normal bulk and the corrugations were very marked in the ileum, almost like what one would observe in a case of Johne's disease. No ingesta was present and only a little fluid in the stomach. The rectum contained a few pellets of faeces and was "lined" with very tenacious mucus.

* * * * *

II

W. McCOLL, M.R.C.V.S.,
Armagh

Subject.—Five-year-old gelding at grass.

Symptoms.—The earliest symptoms were profuse sweating and trembling: at times the sweat poured off him. These passed off and were followed by evidence of difficulty in swallowing. The horse began to lose condition and fed badly. The manure which was passed was hard. At first digestive trouble was diagnosed and a mixture of linseed oil, turpentine and ol. menth. pip. and liq. zingib. conc. was administered, followed by tonic powders. This appeared to produce an apparent improvement except that the horse was passing little manure. A dose of Istin was given. No report was received from the owner for three weeks when a visit was paid and the horse was found to be a bony skeleton. The back was arched and the abdomen tucked up, the temperature was normal, the pulse strong, and there was slight difficulty in swallowing. The animal's appetite was poor but it was able to eat grass. Since then it has been encouraged to take mashes of oats and flaxseed, and now appears to be improving.

Owing to the fact that the horse was not seen during the first two days of its illness, nor during a period of three weeks shortly after the first medicinal treatment was carried out, some of the symptoms may have been missed. The case, however, does bear some resemblance to grass disease and a tentative diagnosis to the effect was made.

* * * * *

Suspected Grass Disease in the Midlands

JOHN A. LEE, M.R.C.V.S.,
Uttoxeter, Staffs

Subject.—A three-year-old Shire mare, one of a bunch of five young horses all doing well until, on May 15th, she was noticed not to have filled her belly. There was progressive loss of condition until advice was sought on May 20th.

Examination.—The condition found was as follows: Tucked up, dull in eye, eating very little, apparent difficulty in swallowing solids, occasional discharge of saliva from mouth and nostrils. Water could be swallowed fairly well but at intervals retching would occur with return of water via the mouth and nose. The temperature was 101·0°, the pulse was rapid and small—about 120; respirations were about normal; there was patchy sweating, and a continuous trembling of muscles in the shoulder and stifle regions. The rectum was full of soft faeces, giving the impression of lack of tone. No impaction of intestine could be palpated *per rectum*.

Treatment and Course.—The stomach tube was passed and as it passed down, with each swallowing movement powerful retching was set up which seemed to cause some pain. The tube was inserted to just beyond the entrance to the chest and the liquid administered passed on into stomach without difficulty. Stimulant and laxative medicine was administered. Withdrawal of the tube again caused retching. On turning out she trotted down the field and whinnied to her mates. When seen on the 21st there was no noticeable change apart from free passage of soft faeces. There was progressive loss of flesh until emaciation was extreme and death occurred on May 30th.

Post-mortem Examination.—This showed no striking features. There was extreme emaciation, corrugation and congestion of intestinal mucosa as in Johne's disease and distension of stomach with watery fluid.

There has been no other trouble with horses on this farm before or since.

Discussion.—Diagnosis in this case was grass disease, although it has not often been recorded in this part of the country. It has since been considered that two recent cases of death after acute abdominal pain, diagnosed as twist but showing no twist on *post-mortem* examination, may have been cases of acute grass disease. It is thought that the comments and experiences of other practitioners on the possible occurrence of grass disease in Midland and Southern counties should prove interesting and profitable.

Weekly Wisdom

Democracy must take the offensive if it is to survive. The zeal and enthusiasm it must engender for this most practical purpose of survival can only come from a sense of movement in the direction of a more efficient and just society. Britain must make up its mind to rid itself of the unnecessary poverty, waste, mass unemployment, physical squalor, ignorance, and malnutrition which mocked at our much-vaunted political freedom before the war. There is a definite limit to what can be done under war conditions, and it is criminal to pretend that war can be immediately followed by plenty. But this is no alibi for not doing all that is possible now or for not obtaining the necessary statutory powers to make further advances possible when the war comes to an end.—"The Forum," *Observer*, December 7th.

* * * * *

The Central Chamber of Agriculture, at a meeting at which representatives of 20 other organisations were present, passed a resolution saying that the post-war economic system should be based on maximum production and consumption, and that the present increased home agricultural production should be progressively maintained.

ABSTRACTS

[I.—STUDIES ON BOVINE MASTITIS: MASTITIS IN HEIFERS. Palmer, C. C., Kakavas, J. C., and Hay, J. R. (1941.) *Amer. J. vet. Res.* **2**. 18.

II.—THE USE OF TRYPAFLAVINE IN THE INFUSION THERAPY FOR STREPTOCOCCIC MASTITIS. Schalm, O. W. (1941.) *Amer. J. vet. Res.* **2**. 117.]

I.—This is a detailed study of mastitis in the heifers of three herds. Particulars of 26 cases are tabulated and detailed accounts given of 14 cases with their symptoms, treatment and results.

Aetiology.—The organism most commonly found was *Staph. aureus*, usually in pure culture, but sometimes in combination with streptococci either in the same or separate quarters. In comparatively few cases streptococci alone were found. Owing to the fact that some staphylococci are apparently non-pathogenic, normal inhabitants of the udder, particular study was made of the differentiation of pathogenic from non-pathogenic types. Both α and β toxins are produced, chiefly the latter, and both are haemolytic in ox blood agar; virulence seems to be in some degree proportional to haemolysin production. No one test is reliable for differentiation but the most valuable appears to be the coagulation of rabbit blood plasma, which property is generally possessed by pathogenic and not by non-pathogenic strains. Gelatin liquefaction, the production of an orange colour on crystal violet agar, the fermentation of lactose and manitol and the litmus milk reaction are tests which are not so reliable. The reaction after intracutaneous injection into the skin of a rabbit is a fairly reliable test in that virulence seems to be proportional to the degree of abscess formation and necrosis produced. All the staphylococci isolated were found to be lysable by a stock, polyvalent *Staph. aureus* bacteriophage and, in general, lysable cultures of udder staphylococci were found to be more virulent than non-lysable ones.

Streptococci of Lancefield groups B and C were found and in seven heifers an unusual streptococcus resembling a human type was isolated. Biochemical details are given.

Cases varied from low grade infections, from which recovery was apparently complete, to more serious ones with gangrene and death. In general the disease was more serious in non-lactating animals than in calved heifers.

The results of infection as shown by the condition of the udder after calving may be—apparent 100 per cent. recovery, induration and deficient milk production, or the milk may be abnormal. Sometimes some portion of the gland may remain functional, but the milk may not be able to be withdrawn owing to occlusion of the teat.

The blood serum of all animals affected with staphylococcal mastitis agglutinated a staphylococcus antigen to a higher titre than did normal controls.

Treatment.—Fomentation and frequent stripping of affected quarters failed to prevent fibrosis and loss of function. Daily injections of a specific bacteriophage *via* the teat were followed by rapid recovery in heifers with non-functioning udders, but in lactating animals this was of little value.

II.—During research on mastitis, Steck concluded that the chief site of mastitis streptococci is in the milk cistern and large ducts rather than in the remote areas of udder parenchyma. He also found that the irritant effect of strong flavine solutions was due to the fact of their retention by the udder tissues. If, however, the flavine was dissolved in 20 per cent. sucrose solution practically all of the infused fluid could be regained and therefore strong solutions could be used with safety.

Following Steck's work, Schalm describes a technique whereby a 1:1500 solution of trypaflavin in 20 per cent. sucrose solution is infused so as just to fill the cistern. This is milked out after five minutes. He claims 65 per cent. of cases cured by one treatment and 93 per cent. by two with little reduction of milk yield, whereas a 1:4000 aqueous solution of trypaflavin causes 50 to 85 per cent. reduction in yield.

J. A. L.

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[THE EFFICACY OF UDDER INFUSION WITH ENTOZON AS A TREATMENT FOR INFECTION WITH GROUP B STREPTOCOCCI *(STR. AGALACTIAE)* Stewart, D. Forsyth. (1940.) *Aust. vet. J.* **16**. 108-111.]

Stewart treated 40 cows affected with contagious bovine mastitis by udder infusion with a 1:1250 solution of entozon. The cows were kept in two different herds and approximately 70 per cent. of the treated cows in each herd responded to two or three treatments and ceased to harbour *Str. agalactiae*. It is perhaps significant to note that results of the same order were obtained in both herds. [The results obtained by Stewart confirm those obtained by Stableforth and Scorgie in Great Britain *vide Vet. Rec.*, 1938, **50**, 663.] The majority of the cows which were resistant to treatment showed extensive fibrosis of the udder. A few of the resistant cases, however, did not fall into this category, and Stewart rightly points out that apart from the severely fibrosed cases which may be classed as hopeless there is nothing to differentiate those cows which will respond to treatment and those which will not.

All the cows were treated during the lactation period. Because of the difficulty of detecting all infections at one examination, Stewart found it wiser to treat all four quarters in any cow found to be infected irrespective of the number of quarters in which infection was diagnosed. The average time taken to treat all four quarters of one cow was 20 minutes. Milk samples from the infected cows were submitted to bacteriological examination seven days after treatment. If the examination was negative, further samples were examined after an interval of seven days. All cows found to be still infected at either the first or second examinations were subjected to another treatment. Thus all cows were required to pass two bacteriological examinations at an interval of a week before being considered free from infection.

A point of great interest in respect of one herd to which Stewart draws attention is that of 14 first-calf heifers which had never been in contact with the dairy before the first milk samples were taken, six were found to be infected with *Str. agalactiae*. The latter were not all born from infected dams. [Confirmed in an extensive report by Bull *et alia* (1940) *vide* abstract in *Vet. Rec.*, 1941, **53**, 483.]

Stewart states that he has not found udder infusion to be of any great assistance in acute cases of staphylococcic mastitis. As might be expected, it is impossible to infuse any quantity of fluid into an acutely inflamed quarter.

N. J. S.

* * * * *

[FURTHER OBSERVATIONS ON THE LIFE CYCLE AND INCIDENCE OF THE SHEEP BOT, *OESTRUS OVIS*, IN NEW MEXICO AND TEXAS. Cobbett, N. G., and Mitchell, W. C. (1941.) *Amer. J. vet. Res.* **2**. 358-366. (5 tables, 1 ref.).]

These authors have previously shown that the life cycle of *O. ovis* could be completed within 4½ months [(1933). *J.A.V.M.A.*, **82**, 780-781]. They now record data obtained with a view to the control of the parasite in New Mexico and Texas. *Post-mortem* examinations were made of over 600 sheep, of all ages, whether dead, ailing or killed for food, throughout the year and the number and developmental stages of all larvae present were noted. In Texas sheep mature larvae in the frontal sinuses were usually present throughout the year but in N. Mexico sheep these occurred only during spring and summer, minute first-stage larvae being found usually only in the nasal passages during the more severe winter season there. About 96 per cent. of sheep were infested. From 1 to 75 larvae per sheep were found with an average for N. Mexico of 20 and for Texas of 8. Horned sheep (with larger frontal sinuses) were generally more heavily infested. Botfly activity was noted all the year except January and February in Texas but only from June to September in N. Mexico. For experimental transmission and observation of development the authors used fly-proof, screened enclosures, and larvae squeezed from the abdomen of gravid female botflies into a little tepid water. An estimated 15 to 25 larvae were then instilled by a medicine dropper into both nostrils of each sheep. All mature larvae deposited in the enclosure were collected daily. The authors found that in N. Mexico development of the larvae was arrested in the nasal sinuses during the winter so that no mature larvae emerged until the warmer weather. The migrations of the various larval stages are recorded. There was a great variation (from 1 to 9 months) in the duration of the three larval stages in the sheep. If heavy initial infestation took place only a few larvae survived to mature in the frontal sinuses after both natural and artificial parasitisation. Pupation periods varied from one to five days and emergence of the flies under favourable conditions averaged 27½ days. In warm weather flies were very active and lived only 1½ days, activity and longevity being in inverse order and varying according to the temperature. An average of 500 ova per female botfly was determined in 18 specimens, from which the authors conclude that many sheep may be parasitised by each gravid botfly.

C. V. W.

The Scientific Poultry Breeders' Association has changed its name to Poultry Association of Great Britain (SPBA).

ROYAL COLLEGE OF VETERINARY SURGEONS

Membership Examinations (December, 1941)

LIST OF SUCCESSFUL CANDIDATES

(*Continued from page* 750)

Glasgow

Final Year:

Auprêt, D.
Bannister, Miss J. D.
Brown, J. (Glasgow)
Brown, R. A.
Clark, J. S.
Crosbie, Andrew
Edwards, J. R.
Findlay, J. W. M.
Forbes, D. A.
Howatson, John
Lambie, Gavin
MacKenzie, G. A.
McLauchlan, David
Meikle, H. A. G.
Muir, Robt. (S)
Steele, James.
Stewart, Thos.
Wardrop, A. G.
Wilson, J. C.
Wilson, Robt.
Young, James

(S) Denotes credit in Surgery.

Liverpool

1st Year:

Johnston, R. M.
Kidd, J.
Williams, C. P.

2nd Year:

Chambers, J. R.
Edwards, H.
Jolla, Miss A. M.
Miscampbell, K. I.
Miller, P. G.
Roberts, T. O.
Thurmand, R. C.
Wynne, I. M.

3rd Year:

Harries, J. O.
Hunnam, R.
Hutchinson, J.
Mutch, A. (A)
Parkinson, J. D.
Platt, H. (A)
Rimmer, B.
Tudor, J. E.
Walker, J. (A)

(A) Denotes credit in Anatomy.

Final Year:

Barber-Lomax, J. W.
Dinsdale, N.
Fergusen, H. H.
Foster, J. L.
Gibson, T. E.
Greenway, E. D.
Mahmoud, A. H.
Pickin, W.
Shaw, I. G.
Stabler, A. B. O.
Wilson, Miss B. H.

London

1st Year:

*Cook, E. R.
Croft, Miss M. E.
Duncan, E. S.
Edgson, F. A.
Gardner, B. L.
Hopkins, W.
Jones, S. M. C. (B)
*Lawn, A. M.
Leftwich, R. B. W.
Loftus, A. C. (B)
Pettifer, J.
Scott, Miss S. M. S.
Ussher, Miss G. C.

* Denotes 2nd class Honours.

(B) Denotes credit in Biology.

2nd Year:

Broad, R. C.	Harvey, D.
Daniel, W. J.	Holford, G. (P)
Das, M. S.	Perrett, D. R.
Goulstone, R.	Salmon, W. M. (P)
Gray, L. J.	Shuja, J. D.

(P) Denotes credit in Physiology.

Edinburgh

1st Year:

Allen, Duncan	Roe, D. M.
Mackenzie, Finlay (B)	Shearer, G. C.
Newlands, T. B.	

(B) Denotes credit in Biology.

2nd Year:

Chambers, T. A. M.	Oxley, Henry
Coupland, A. M. T.	Russell, A. G. N.
Fennell, Clement	Scott, H. M.
Harkness, B. R.	Stewart, Alex.
McKee, F. A.	

3rd Year:

Conn, W. B.	Hooton, J. K.
Cox, R. L.	McIntyre, W. I. M.
Couston, J. M.	Naismith, R. S. (A) (H)
Dougill, G. P.	Park, R. C.
Dougill, Jack	Shilliday, E. A.
Dymock, W. H. (A)	Sim, L. S.
Garden, J. F.	Walker I. A.
Hall, J. G.	Wishart, Graham

(A) Denotes credit in Anatomy.
(H) Denotes credit in Hygiene.

4th Year:

Crichton, R. D. V.	Lowes, Emerson (Paras)
Daniell, G. H. (Paras)	Mackintosh, A. S.
Forster, John	MacTaggart, H. S.
Greig, W. A.	Massey, Roger
Guilbridge, P. D. L.	Newsam, T. J.
Houston, T. H.	Robinson, Caulfield
Hutchinson, R. A.	Rogerson, Thomas
Hughes, E. E.	Ross, Alex.
Inglis, J. W. C.	Shaw, W. B.
Ironside, C. J. T.	Sinclair, W. B. V.
Laing, A. H.	Smith, D. C.
Lang, James	Smith, James
Longley, R. F. A. L.	Wolfe, T. B.

(Paras) Denotes credit in Parasitology.

Final Year:

Aitken, H. F. M.	Johnson, J. E.
Awkati, H. A.	Khayyat, S. M.
Barrie, N. M.	McDougall, J. B.
Brydon, D. A. D.	Masterton, R. S.
Coulton, R. H. M.	Simon, R. F.
Cruickshank, I. M.	Smith, A. H.
Douglas, R. A.	Sutton, E. G.
Hagri, M. A.	Taylor, A. M.
Henderson, Wm.	

Dublin

1st Year:

Bourke, J. P.	McDonald, Robt.
Burke, J. T.	Menton, B. J.
Byrne, J. J.	Nolan, Francis
Conlon, P. K.	O'Dee, M. J.
Cosgrove, J. F.	O'Mahony, C. P.
Curtin, Sean (B)	Redahan, B.
Dodd, L.	Walker, D. A.
Gallagher, P. M.	

(B) Denotes credit in Biology.

2nd Year:

Burgess, S. R. (P)	*Murphy, Laurence
Cooper, R. J.	O'Callaghan, F. J.
Feeney, G. H.	*O'Moore, L. B. S.
Fiddis, W. A.	Shearman, F. E.
Flanagan, M.	Sheahan, Miss M.
Gavagan, P. B.	Sweeney, P. J. A. (P)
McGittigan, C. J.	Young, J. A.
Moorhead, P. J.	

(*) Denotes 2nd class Honours.

(P) Denotes credit in Physiology.

3rd Year:

Connelly, G. F.	O'Regan, R. J.
Cranley, J.	Paul, C. B.
Dwyer, A. J.	Power, J. H.
Fay, T. G.	Quealy, A.
Kelly, Roderick	Rice, D. P.
McCullough, M. R. S.	Tyrrell, J. T.
McNelis, N. J. (P) (A)	Wildman, W. D.

(P) Denotes credit in Pharmacology.

(A) Denotes credit in Anatomy.

4th Year:

Carroll, G. A.	McGowan, T. E.
Coyle, M. J.	Marshall, D. R.
Dempsey, N. P.	Mockler, T. V. (Paras)
Fitzsimmons, T. G.	Murphy, R. T. M.
Gwynn, Miss O. R.	Pollock, A.
Jones, A. R. (Path)	Russell, Miss E.
Harrington, D. P.	Thornberry, H.

(Paras) Denotes credit in Parasitology.

(Path) Denotes credit in Pathology.

Final Year:

Browne, C. C.	Lappin, A. P.
Burns, T. F.	Lynch, T. A.
Clarke, J. B.	McLaughlin, J. F.
Gallagher, M. A.	McVeigh, D.
Hunter, W. M. D.	Nayar, R. K.
Kane, G. J.	O'Reilly, H. L.

(*To be concluded*)

LIVERPOOL SCHOOL OF VETERINARY SCIENCE

Degree Examination Results

The following are the University of Liverpool, School of Veterinary Science, Examination Lists for December, 1941, in connection with the University Degree of B.V.Sc.:—

Final Examination.—*Part I.*—Bee, B. R., Clay, H. A., Donnelly, J. F., Jones, D. K., Wilson, A. A.; *Part II.*—Clay, H. A., Jones, D. K., Wilson, A. A.

Fourth Examination.—Griffiths, R. B., *Smith, J.

Third Examination.—*Part I.*—Jarvis-Evans, D. G., Platt, H., Tudor, J. E.; *Part II.*—Jarvis Evans, D. G., Platt, H., with Distinction, Tudor, J. E., Walker, J.; *Part III.*—Platt, H., Tudor, J. E.

Second Examination.—Adams, A. D., Done, J. T., Fox, H. J., Hall, C. A., Humphreys, J. R., Kay, R. S., Littlejohn, Annie I., Maddocks, J. T., Miscampbell, K. I., Pinsent, P. J. N., Roberts, T. O., Robinson, P., Wynne, I. M.

* Distinction in Veterinary Parasitology and Entomology.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Dec. 29th.—N.V.M.A. Committee Meetings, 36, Gordon Square, W.C.1.

Dec. 30th.—N.V.M.A. Committee Meetings at 36, Gordon Square; Meeting of Council, N.V.M.A., at the Connaught Rooms, Kingsway, 2 p.m.

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Women Veterinary Surgeons and National Service

In a letter received from the Ministry of Labour by Miss M. A. W. Bentley, M.R.C.V.S., Hon. Secretary of the Society of Women Veterinary Surgeons, in reply to her enquiry regarding the position of women veterinary surgeons in relation to service in H.M. Forces and Civil Defence, the following ruling is given:—

"Women veterinary surgeons are reserved at all ages. Volunteers may be, irrespective of age, accepted for service in any of the branches of National Defence in any scientific or professional capacity for which they are fitted by reason of their knowledge and training.

"A veterinary surgeon student who has passed his or her first professional examination or equivalent examination, is also reserved at all ages.

"Up to the present no woman veterinary surgeon or student veterinary surgeon should have been called for interview, after having registered under the Registration for Employment Order, which she is obliged to do if she is within the specified age groups called upon to register."

The letter concludes: "You will no doubt appreciate, however, that in view of the important discussions now taking place in Parliament, the Department is at present unable to advise you as far as the future position is concerned." In this connection we are informed by the Ministry that the position to date remains as represented by Miss Bentley's informant.

* * * * *

Home Guard Compulsion Proposals

Proposals for applying a measure of compulsory service in the Home Guard were laid before Parliament on December 17th and are contained in the White Paper (Cmd. 6325, Stationery Office, 1d.). It will be remembered that in introducing the National Service (No. 2) Bill, the Minister of Labour stated that proposals for increasing the scope and efficiency of the Home Guard would be dealt with separately, but we are informed by the War Office that nevertheless they are to be regarded as part of the measure and that, accordingly, members of the veterinary profession, whose full reservation as a body is retained, are exempted from the operation of the new Home Guard compulsion measures now to be provided for by Defence Regulation.

As to the proposals themselves, the reason for compulsion has nothing to do with a general shortage of numbers in the Home Guard. The force has, in fact, been maintained at roughly its present strength for a long time, and recruits have not been accepted save in districts where there were shortages. Nor is it now proposed to increase its numbers substantially.

The first and most important gap requiring to be filled is due to the fact that the strength of the Home Guard at present depends on the density of population in the district, and that in some districts—those, for example, where a large measure of evacuation has been carried out—where it is important that the Home Guard should be strong, the population is very small.

The second weakness which it is desired to remedy is that a proportion, though not a very large one, of members of the Home Guard have to be reminded that an untrained man is a liability rather than an asset, especially with the new and in some cases relatively complicated weapons now being issued.

The first problem is to be solved by a system of local compulsion. That is to say, in districts where, in the view of the Army Council, the Home Guard requires a considerable strengthening, and in no others, compulsion will be applied. The Army Council will in such instances take its decisions with the advice of the Commander-in-Chief, who has to co-ordinate the Home Guard in the general scheme of defence.

The proposed solution of the second problem is abolition of the right to resign at 14 days' notice—what has been jocularly called "the housemaid's clause"—the taking of power to impose obligatory training and duty, and the introduction of sanctions similar to those affecting the Territorial Army in time of peace.

Though at first sight it may appear unfair that a man in one district should be called upon to join the Home Guard, whereas if he had resided in another close at hand he would not have been, this is not really the case. Compulsion will be applied only within the age limits of 18 to 51, though the original limits of 17 to 65 will be maintained for volunteers. In the former group every man now comes within some form of compulsion in any case, and the Minister of Labour and National Service can call upon him as he desires. Moreover, calling up will take place with exactly the same safeguards as for the other services and with the same rights of appeal.

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University Students and the Home Guard

Contributing to the current correspondence in *The Times* on the above subject, Mr. A. Stuart King, of The Rectory, Leigh-on-Sea, Essex, states (in the course of his observations) that as a sergeant in the Home Guard and an S.T.C., and as a student at the Royal Veterinary College, he has followed this correspondence with interest, and proceeds: "I feel sure that with modifications to allow the more senior students to do the usual practical work with qualified veterinary surgeons in the vacation, the project of retaining students in their term-time Home Guard units during the vacation would be warmly welcomed by the College.

"Two advantages would accrue; first, major Home Guard units in university areas would not be dangerously weakened for three-fifths of the year; second, the students could receive daily concentrated training on a scale far exceeding the term-time "Sunday and one night a week" principle. Reserved students would thereby be of double value to the nation, both as potential members of vital professions, etc., and as fully trained fighting men. Surely these benefits would amply recompense the Government for any expense incurred."

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R.C.V.S. OBITUARY

Morgan, Edward, 27, Maengwyn Street, Machynlleth, Montgomeryshire. Graduated London, May 16th, 1890. Died 1941.

Smith, Thomas William, Divisional Veterinary Inspector, Larne Harbour, Co. Antrim. Graduated London, December 20th, 1907. Died December 12th, 1941; aged 62 years.

Thorburn, Edwin James, Church Street, Crewkerne, Somerset. Graduated London May 10th, 1893. Died December 14th, 1941; aged 74 years.

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ROYAL COLLEGE OF VETERINARY SURGEONS

Members' Addresses Required

The Registrar begs to announce that the addresses of the following members are unknown to him. The usual statutory notices have been issued in accordance with the Veterinary Surgeons Act, 1881, Sec. 5(4), but replies have not been received from the members indicated. The Registrar will be grateful for any information as to the whereabouts of these members.

Member's last known address.

Adams, J. E., 126, Fore Street, Kingsbridge, Devon.
Brundell, R. E., 5, Wolseley Terrace, Houndiscombe Road, Plymouth.
Burke, J. A., c/o Pittance Farm, Cranleigh, Surrey.
Cairns, G., 464, Bathurst Street, Toronto, Canada.
Campbell, J. J., c/o Department of Agriculture, Dublin.
Clyde, T., 7, Effingham Crescent, Dover.
Custance, H., Rowley Fields, Leicester.
Davies, Capt. R. T., 31, Winn Road, Southampton.
Dimes, D. H., Capt. late R.A.V.C.
Dodd, D. O., Midsomer Norton, Bath, Somerset.
Faithfull, Major T. J., 48, New Cavendish Street, London, W.1.
French, J. A., 34, Caerau Road, Newport, Mon.
Gilford, N., 3a, High Street, Bromley, Kent.
Gillett, Lt.-Col. E. S., Charlton Park, Malmesbury, Wilts.
Gilmore, A. E., Moorfields, Poulton, Blackpool
Gulleford, W. W., 62, Albert Road, Hythe, Kent.
Heffernan, Capt. M. A., Clarke Barracks, Curragh, Co. Kildare, Eire.
Hind, J. H., 5, East View Terrace, Winthorpe, Skegness.
Hutton, Capt. C. A., Trevor House, Trevor Street, Llandudno.
Jarratt, W. F., The Gables, Rusthall, Marlborough, Wilts.
Kemp, J. F., 22, Highfield Road, Edgbaston, Birmingham
Kilpatrick, W. A., Big Muddy, Saskatchewan, Canada.
Knott, G. K. L., 97, Hackthorne Road, Cashmere, Christchurch, N.Z.
Lawrie, A. S., Major late R.A.V.C.
Leonard, H. S., 93, Condamine Street, Manly, Sydney, N.S.W., Australia.
Llewellin-Evans, T. G., 11, Langbourne Mansions, Highgate, N.6.
McAteer, J., Dept. of Agriculture Dublin.
Matson, T., 10, Albany Street, Edinburgh.
Mills, W. R., Brooke House, Brooke, nr. Norwich.
O'Connell, Capt. M. G., Prospect House, Fore Street, Kingsbridge, Devon.
Oliphant, Miss J. A., 33, Moulin Road, Crookston, Glasgow, S.W.2.
O'Reilly, M. J., Veterinary Dept., Stormont, Belfast.
Paul, Capt. H. M. B., Rothbury, *via* Morpeth, Northumberland.
Pugh, Capt. J., Brasted, The Ridgeway, Newport, Mon.
Quinlan, D., South Lodge, Carrick-on-Suir, Co. Tipperary, Eire.
Ritchie, A. F., 28/30, May Street, Belfast.
Roberts, Major N. D'E., Alderin, Monkstown, Co. Cork, Eire.
Ross, K. A., Leicester Road, Hinckley, Leics.
Rucker, E. A., 9, Walpole Road, Hampton Road, Twickenham, Middlesex.
Simpson, H. G., Wych Cottage, Amersham, Bucks.
Sinton, W. L., Major late R.A.V.C.
Smith, W. R., Ferndale, St. James Park, Brechin, Angus.
Strachan, Miss I. C., 40, Cleveland Road, W. Ealing, W.13.

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LEGAL NOTES

Failure to Isolate Tuberculous Cows.—At Wimborne Petty Sessions, recently, Edward John Hooper, cattle dealer, of Almer, was summoned for having on two different dates, whilst in possession of or having charge of two cows which were affected with tuberculosis, failed to detain and isolate them from other bovine animals and exposed them with other animals at the Wimborne Grading Centre. He was fined £20 in each case, plus £21 costs, the defendant having agreed a month previously, when the case was mentioned, to pay the costs of the adjournment desired. Defendant was also fined £1 for failing to keep the prescribed record of the movement of the animals, a total of £62.

Following the Bench's intimation of a conviction on the first of the two cases of failure to isolate, defendant who had pleaded not guilty on the advice of his solicitor (Mr. K. Kusel), pleaded guilty to the second offence.

Prosecuting for the County Solicitor, Mr. J. R. Poole explained that reference to defendant's records should have shown where he obtained the cows from and to whom they were delivered, but they were quite sketchy and did not give the details required.

P.C. Witt gave evidence.

Mr. F. Fox, M.R.C.V.S., Superintending Veterinary Inspector of the Ministry of Agriculture, spoke of finding the cows in the market, and said a *post-mortem* examination showed advanced signs of tuberculosis. The carcases were seized by the meat inspector as unfit for human consumption. One of the three cows was affected with pleurisy and pneumonia, and was also seized by the meat inspector. In cross-examination witness said there were bound to be many cattle suffering from tuberculosis getting through. All markets were not inspected. There was a grading panel who only graded for the purpose of food, and they might or might not call attention to the fact that an animal was suffering from tuberculosis—they were not veterinary surgeons. If cows were graded the Ministry, and incidentally the public, had to pay for seized meat. The main object was to try and get through the graders, and dealers exploited the present position when they were offered a price which they had never been offered before for screw animals and took the risk.

Mr. James McLaughlan, another inspector, corroborated.

Defendant declared that he had no idea that either of the three cows was suffering from any disease. He had had them at least six weeks, during which they were healthy and feeding in the field quite well. Any cows coughed. Had he known they were diseased he would not have brought them to the market.

Giving evidence in the second case relating to the failure to isolate, Mr. McLaughlan said both cows were in an advanced stage of tuberculosis and they were totally condemned by the meat inspector.

Mr. Kusel pointed out that one of the cows came from Yeovil market only about a fortnight previously, and no doubt there passed before a good many people without tuberculosis being suspected.—*Western Gazette.*

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GLASGOW VETERINARY COLLEGE

Annual Prize-giving

The annual prize-giving at the Glasgow Veterinary College took place on Thursday afternoon, November 20th, in the College Buildings, 83, Buccleugh Street, Glasgow. Mr. Alexander Murdoch, Chairman of the

Board of Governors, presided, and the prizes were handed to the successful students by Colonel W. D. Scott, D.S.O., M.C., who is the Divisional Food Officer for the West of Scotland. Principal Whitehouse was unable, through indisposition, to be present, and Professor Robb deputised for him.

At the outset the Chairman made a short statement in which he expressed the thanks of the Governors to those local authorities in the West of Scotland which contribute to the finances of the College. In the course of his references to the activities of the College during the year, Mr. Murdoch said it was known that 34 students were on active service, and probably there were many more that they did not know of. One student lost his life in an air raid last spring, and one was a prisoner of war in Germany; whilst another, Flying Officer N. J. A. Paton, had been awarded the Distinguished Flying Medal.

The Governors' report showed that during the session 1940-41 35 students of the College passed the final and qualified M.R.C.V.S.; but the war had seriously disturbed the prospects of employment for recent graduates. The veterinary profession is reserved, and yet military and civil avenues of employment have been much reduced. The evacuation of coast towns had destroyed the prospects of many flourishing practices. It is the opinion of the Principal that the disturbance is temporary and that after the war the demand would be greater than ever.

Mr. Murdoch then introduced Colonel Scott and called upon him to present the prizes to the successful students. The prize list was as follows:—

FIRST YEAR

Silver Medal in Chemistry: Andrew Wilson.
Silver Medal in Biology: Miss Jean M. Wilson.
Certificate in Chemistry: Andrew Wilson (credit), *John Brown, *Jack Burns, Alexander MacKenzie (credit), *Miss Jamesina MacKenzie, William Thompson, Charles Watters.
Certificate in Biology: Miss Jean M. Wilson (credit), *Jack Burns, Richard Hyam (credit), Miss Mary C. C. Lobban (credit).

SECOND YEAR

Silver Medal in Physiology: *Cecil A. Hartmann-Smith.
Silver Medal in Histology: *Peter S. Hastie.
Silver Medal in Junior Anatomy: *Joseph Parker.
Certificates in Physiology: Cecil A. Hartmann-Smith, Peter S. Hastie, Joseph Parker, *Alan H. Foster, *Thomas C. Denholm.
Certificates in Histology: Cecil A. Hartmann-Smith, Peter S. Hastie, Joseph Parker, Alan H. Foster.
Certificate in Junior Anatomy: Joseph Parker.
Certificate in Animal Management: Cecil A. Hartmann-Smith (silver medal and credit), J. B. Besant (credit), D. P. Robertson, Robert M. Roberts, Stewart Hastie.

THIRD YEAR

Silver Medal in Anatomy: D. Buntain.
Silver Medal in Pharmacology: *R. M. Wilson.
Silver Medal in Hygiene: *G. W. Serth.
Certificate in Anatomy: D. Buntain (credit), R. M. Wilson, G. W. Serth, R. W. Bryson (credit), W. G. Buchanan (credit), T. H. Duncan, William Stewart (credit), Miss P. M. White (credit), F. B. Brocklehurst, D. G. Clow (credit), Miss Margaret Cooper (credit), H. D. Dewar (credit), N. M. Noble, L. S. Pfob, David Sillars.
Certificate in Pharmacology: R. M. Wilson, G. W. Serth, R. W. Bryson (credit), Miss Margaret Cooper (credit), W. G. Buchanan, T. H. Duncan, William Stewart (credit), Miss P. M. White, A. C. L. Brown, J. R. Fraser.
Certificate in Hygiene: G. W. Serth.
* Second Honours in Professional Examination.

FOURTH YEAR

Silver Medal in Pathology: J. B. Bayliss.
Silver Medal in Parasitology: P. J. Quigley.
Certificate in Pathology: J. B. Bayliss.
Certificate in Parasitology: J. B. Bayliss, P. J. Quigley, R. I. Thain, Miller Watson.

FIFTH YEAR

Gold Medal for best aggregate in Professional Examinations without one failure throughout the past five years' course: A. C. Anderson.
Silver Medal in Medicine: Robert Auld.
Silver Medal in Surgery: Andrew Crosbie.
Certificate in Medicine: Robert Auld, D. B. Shaw.
Certificate in Surgery: Robert Auld, Andrew Crosbie, D. B. Shaw, William W. Black, J. Brown (Airdrie), William Semple.

SPECIAL PRIZES

Special prize of £2 2s. given by Dr. Whitehouse for best aggregate in Anatomy (Junior and Senior and Professional): D. Buntain.
Special prize of £2 2s. given by Mrs. Marshall for best aggregate among the girls in Anatomy (Junior and Senior and Professional): Miss M. B. Cooper.
Special prize, value £1 1s., given by Dr. Lindsay for runner-up in Physiology: Joseph Parker.
Special prize, value £1 1s., given by Dr. Lindsay for runner-up in Histology: A. H. Foster.
Annual prize of £5 presented by the Governors of the College for the best "Student Address" during the session 1940-1941: G. W. Harris.
Fellowship Diploma: J. M. Swanney and R. Brown.

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LIVESTOCK RATIONS

"Apart from special chick rearing rations, particulars of which have already been announced, there are few changes in the rationing arrangements for the remainder of the winter period," states the Ministry of Agriculture in a recent announcement, which continues: "All farmers will be required to register afresh with not more than three suppliers for the period beginning January 1st, and forms will be sent to them for this purpose. Wet grains are obtainable without coupons, but intending purchasers must register with a brewer, distiller, or wet grains contractor; no form for this purpose is necessary.

"No change is being made in the basis of the rations for dairy cows and calves, goats and kids. Dairy farmers are advised that they must forward promptly their application forms for their rations in respect of milk sales. Unless these forms are received at the latest by the end of the month to which they relate, coupons may be withheld. This gives the farmer at least six weeks to complete the form. Dairy farmers are also reminded that where they have undertaken to sell 4 cwt. of corn per cow in order to obtain coupons for all milk sold, with a view to the purchase of compounds, they must carry out those undertakings by December 31st; otherwise deductions may be made from future rations to the extent of earlier over-issues.

"Dairy farmers who have hitherto had the deduction from their rations of ½-cwt. per cow waived on the ground that they have been unable to thresh their corn, will, commencing with January, have a further deduction of ½ cwt. per cow per month, making 1 cwt. per month in all, until the over-issues have been off-set. If, however, such farmers are still unable to thresh their corn, they may be allowed full rations for all milk sold during the remainder of the winter period, provided that they undertake to sell 4 cwt. of corn of their own growing for every cow in the herd before March 31st next.

"The rations issued in respect of milk consumed in the farmer's own household will be continued at the rate of ½ unit per month, but will consist of equal quantities of protein and cereals. One unit will be issued for January and one for March (the coupons being valid for supplies in those months or in the months respectively following them) to every cow keeper irrespective of the number of cows he keeps. A similar allowance will be granted to the owner of milch goats, but will be halved where only one milch goat is kept.

"A small allowance will be available, on application, for mountain and hill ewes where harsh weather conditions are experienced about lambing time, provided that feeding-stuffs are not available on the farm."

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LIVESTOCK EXPORT GROUP

Mr. Nevill Matthews, presiding at the first meeting of members of the Livestock Export Group, in opening the proceedings stated that 32 breed societies and 27 exporters and shippers had applied for membership. He said he fully anticipated an increase in these numbers as several bodies would be considering the question of joining the Group at their next meetings.

Consideration was given to the conditions governing membership, and it was unanimously agreed to limit the financial liability of Breed Societies as follows:—Annual subscription, £2 2s. and any debit balance at the end of any one financial year to be paid for in proportion to the number of pedigree stock exported through each society during that year. The maximum liability in this connection to be £25 for Cattle and Horse Societies and £10 for Sheep and Pig Societies.

It was unanimously resolved to record a vote of thanks to Mr. F. Nevill Matthews for his untiring efforts in connection with the preliminary arrangements of the Group and for all the strenuous work he had so very kindly carried out in the interests of the livestock export trade and which were very greatly appreciated by the members. Mr. Matthews thanked the members for their kind appreciation of his services and added that the work had been a great pleasure to him as he felt that the Group would prove to be of great assistance to Breed Societies, exporters and shippers during the war, and even more so afterwards, when it would be most valuable in assisting and advising in the inevitable restocking of continental countries.

Mr. W. M'Nair Snadden, M.P., was elected Chairman of the Group, and it was agreed to appoint two committees, one representing breed societies and small livestock, and one for exporters and shippers, the combination of the two committees to constitute a general committee. Also, that the Executive Committee should consist of four members from each of these two committees.

Mr. F. J. Bull, the Secretary of the British Dairy Farmers' Association, was unanimously appointed Secretary to the Group and it was agreed that the offices should be at 28, Russell Square, London, W.C.1. It was unanimously agreed to include small livestock, such as dogs, poultry, etc., in the activities of the Group.

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MINISTRY OF AGRICULTURE NEWS SERVICE

An "Axe" Stayed

Pigs, in Smaller Number, are Stabilised.—The Minister of Agriculture, replying to a question in the House of Commons, said that a considerable reduction in pig numbers had been necessary since the outbreak of war in view of the limited supplies of concentrated feeding-stuffs. No further reduction was now required and prices of pigs had been adjusted accordingly. Mr. Hudson pointed out that various measures such as the organised collection of swill had been undertaken to ensure the maintenance of the greatest possible number of sows and other pigs under existing conditions. The maximum production of pig meat from the limited supplies of feeding-stuffs available, he added, was secured when pigs were fed on to bacon weight and not slaughtered as porkers. The older pigs could also thrive with a higher proportion of waste materials and bulky foods in the ration than younger pigs of the porker class.

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Straw for Paper

Farmers' Needs Were First Consideration.—It has been suggested that the sale of straw off farms for paper-making is not consistent with the shortage of animal feeding-stuffs and the need for maximum quantities of farmyard manure; that conflicting demands have been made by the Agricultural Departments on the one hand and the Ministry of Supply and the Papermakers' Association on the other. These criticisms are ill-founded. Not only has there been close co-ordination on the subject by the Departments concerned, but first consideration was given to farmers' own requirements for stock feeding, making muck, thatching and other purposes. The papermakers asked for less than 5 per cent. of the present total production of straw, a quantity that can readily be spared from the surplus production on farms.

The very big expansion of corn growing has meant that in spite of the much wider use of straw for feeding to animals there are not the numbers of livestock to convert all that remains into farmyard manure. The papermakers' requirements are quite consistent with the Ministry of Agriculture's advice to farmers to make greater use of the soda treatment which improves the feeding value of straw. The disposals arranged with the Ministry of Supply put the emphasis on wheat and barley straw and not on good quality oat straw, with its higher feeding value. A scale of differential maximum prices also has been fixed to discourage farmers from selling straw unless it is surplus to their own total requirements.

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Management of Pastures

Winter Harrowing and Early Grass Silage.—Quality in pastures can be raised substantially by manuring and good management. Harrowing in winter, hard grazing with periods of rest at the right times, and mowing to remove all surplus and uneaten grass come under the heading of management. Harrowing should be an important part of the farm programme in the next few months; in their plans for the spring, farmers should remember that grass cut for silage at a time when it is growing rapidly has a higher feeding value than the hay aftermaths. If nitrogenous fertilisers have been used the surplus for conservation is greatly increased.

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Winter Milk Supplies

Need for Maximum Output on Every Farm.—The seasonal drop in milk supplies is complicated this winter by additions to the classes of priority consumers and the shortage of imported cattle foods. Normal deliveries to households have had to be cut so that infants, school children, adolescents and invalids shall not go short.

It is recognised that dairy farmers, in face of many difficulties, are rendering excellent service. Herd maintenance now depends on their capacity for growing feeding-stuffs on the farm, and winter feeding differs markedly from the pre-war standard. Every gallon of milk is precious, with yields depending on the use that is made of every kind of cattle food.

To help the milk producer with his new problem the Ministry of Agriculture has published a special leaflet on "Feeding for Winter Milk." It is No. 80 in the "Growmore" series and can be obtained free, and post free, from the Ministry at Lindum Hotel, St. Annes-on-Sea, Lancashire. The leaflet brings its subject within the scope of every farm, presenting ration charts and general advice that should result in maximum winter production.

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Rearing Calves

How to Restrict the Use of Milk.—There is a keen demand for store cattle and dairy stock and milk producers should make a point of rearing good heifer calves either for herd replacements or for sale. Normally, there is nothing like plenty of milk for this purpose. Now, however, there is not enough to go round and approved calf foods are being provided so that only a minimum quantity of fresh milk need be kept on the farm for feeding to calves. The newly-born calf should, of course, receive its own mother's milk for at least two days and new whole milk during the next two weeks, but by the third week substitutes can be gradually introduced. Calf gruels, meals and rearing mixtures are available at controlled prices and full use should be made of them on the lines indicated in the Ministry of Agriculture's "Growmore" Leaflet No. 66, obtainable free, and post free, from the Ministry of Agriculture, Lindum Hotel, St. Annes-on-Sea.

The use of these milk substitutes (which carry the approval of the Ministry of Food) is an obligation on every milk producer. Their saving is estimated to be 40-60 gallons of milk per calf and their cost is several times less than the current price of the whole milk they replace.